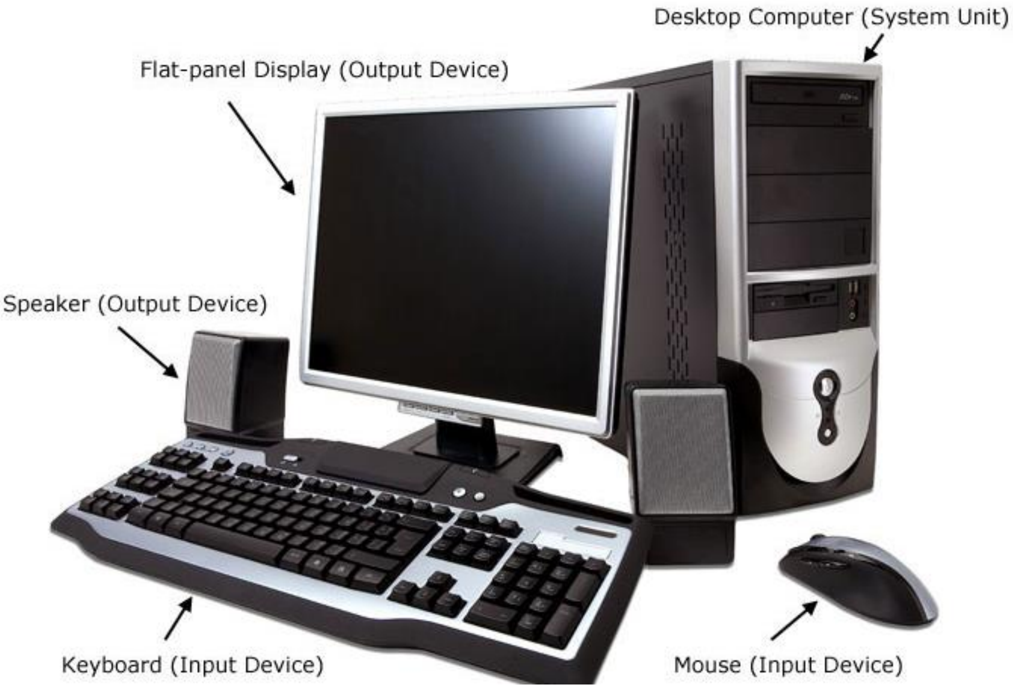


COMPUTER FUNDAMENTALS

Computer Fundamentals and Learnings

Compiled by : Mr. Rameswar Mishra

Rs. 35/-

Contents

Contents

Introduction of Computer 3
Development of computer 3
THE ABACUS→ 3
NAPIER'S BONES→ 3
PASCAL'S CALCULATOR→ 4
LEIBNZ CALCULATOR→ 4
ANALYTICAL ENGINE→ 4
Generations of Computer 4
Computers Types 4
Parts of 6
Hardware 6
Software 6
Operating systems 7
Network 8
Internet:- 9
Input Devices 9
Output Devices 9
Computers Uses 9
Computers Future 10

Computer Fundamental

Introduction of Computer:-

Computer is a programmable machine. The two principal characteristics of a computer are: It responds to a specific set of instructions in a well-defined manner and it can execute a pre-recorded list of instructions (a program).

Modern computers are electronic and digital. The actual machinery — wires, transistors, and circuits — is called hardware; the instructions and data are called software.

A computer is a programmable device that can store, retrieve, and process data.

A computer is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. Complex computers also include the means for storing data (including the program, which is also a form of data) for some necessary duration. A program may be invariable and built into the computer (and called logic circuitry as it is on microprocessors) or different programs may be provided to the computer (loaded into its storage and then started by an administrator or user). Today's computers have both kinds of programming.

Development of computer:-

Actually speaking electronic data processing does not go back more than just half a century i.e. they are in existence merely from early 1940’s. In early days when our ancestor used to reside in cave the counting was a problem. Still it is stated becoming difficult.

When they started using stone to count their animals or the possession they never knew that this day will lead to a computer of today. People today started following a set of procedure to perform calculation with these stones, which later led to creation of a digital counting device, which was the predecessor the first calculating device invented, was known as ABACUS.

THE ABACUS→

Abacus is known to be the first mechanical calculating device. Which was used to be performed addition and subtraction easily and speedily? This device was first developed by the Egyptians in the 10th century B.C, but it was given it final shape in the 12th century A.D. by the Chinese educationists.

Abacus is made up of wooden frame in which rod where fitted across with rounds beads sliding on the rod. It is divided into two parts, called ‘Heaven’ and ‘Earth’. Heaven was the upper part and Earth was the lower one. Thus any no. can be represented by placing the beads at proper place.

NAPIER’S BONES→

As the necessity demanded, scientist started inventing better calculating device. In this process John Napier’s of Scotland invented a calculating device, in the year 1617, called the Napier Bones.

In the device, Napier's used the bone rods of the counting purpose where some nos. are printed on these rods. With these rods one can do addition, subtraction, multiplication and division easily.

PASCAL'S CALCULATOR→

In the year 1642, Blaise Pascal a French scientist invented an adding machine called Pascal's calculator, which represents the position of digit with the help of gears in it.

LEIBNZ CALCULATOR→

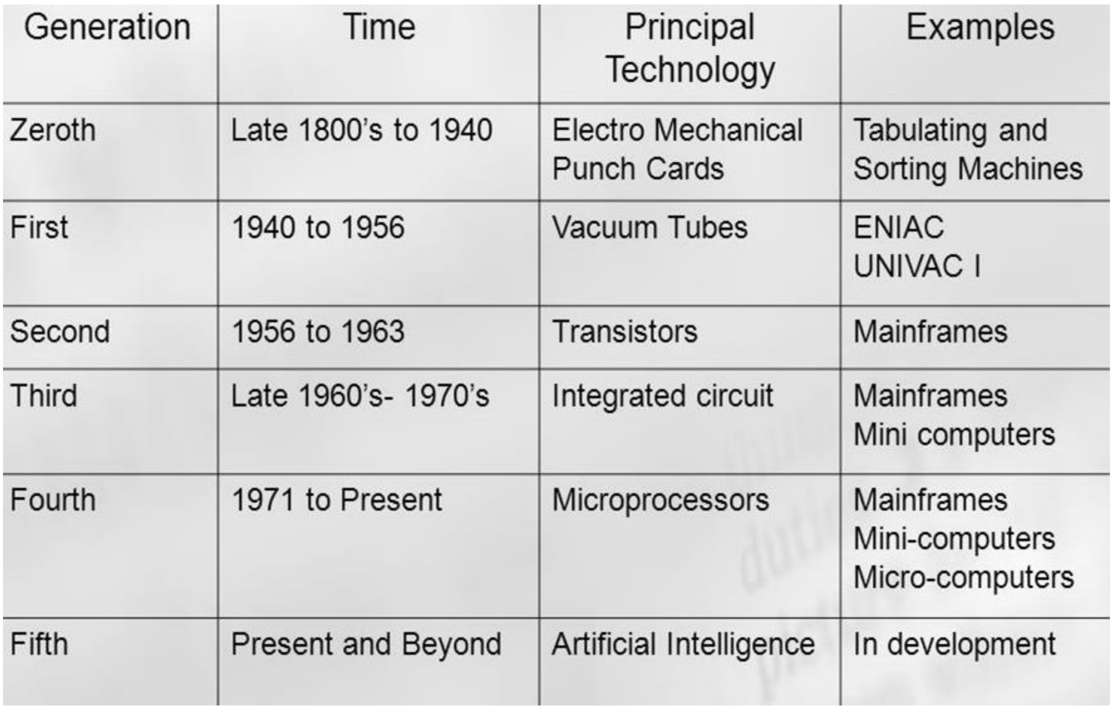
In the year 1671, a German mathematics, Gottfried Leibniz modified the Pascal calculator and he developed a machine which could perform various calculation based on multiplication and division as well.

ANALYTICAL ENGINE→

In the year 1833, a scientist form England known to be Charles Babbage invented such a machine. Which could keep our data safely? This device was called Analytical engine and it deemed to be the first mechanical computer.

It included such feature which is used in today's computer language. For this great invention of the computer, Sir Charles Babbage is also known as the father of the computer.

Generations of Computer:-



Generation	Time	Principal Technology	Examples
Zeroth	Late 1800's to 1940	Electro Mechanical Punch Cards	Tabulating and Sorting Machines
First	1940 to 1956	Vacuum Tubes	ENIAC UNIVAC I
Second	1956 to 1963	Transistors	Mainframes
Third	Late 1960's- 1970's	Integrated circuit	Mainframes Mini computers
Fourth	1971 to Present	Microprocessors	Mainframes Mini-computers Micro-computers
Fifth	Present and Beyond	Artificial Intelligence	In development

Computers Types:-

Computers are typically classified based on their uses:

Based on uses→

- Analog computer
- Digital computer
- Hybrid computer

Based on sizes→

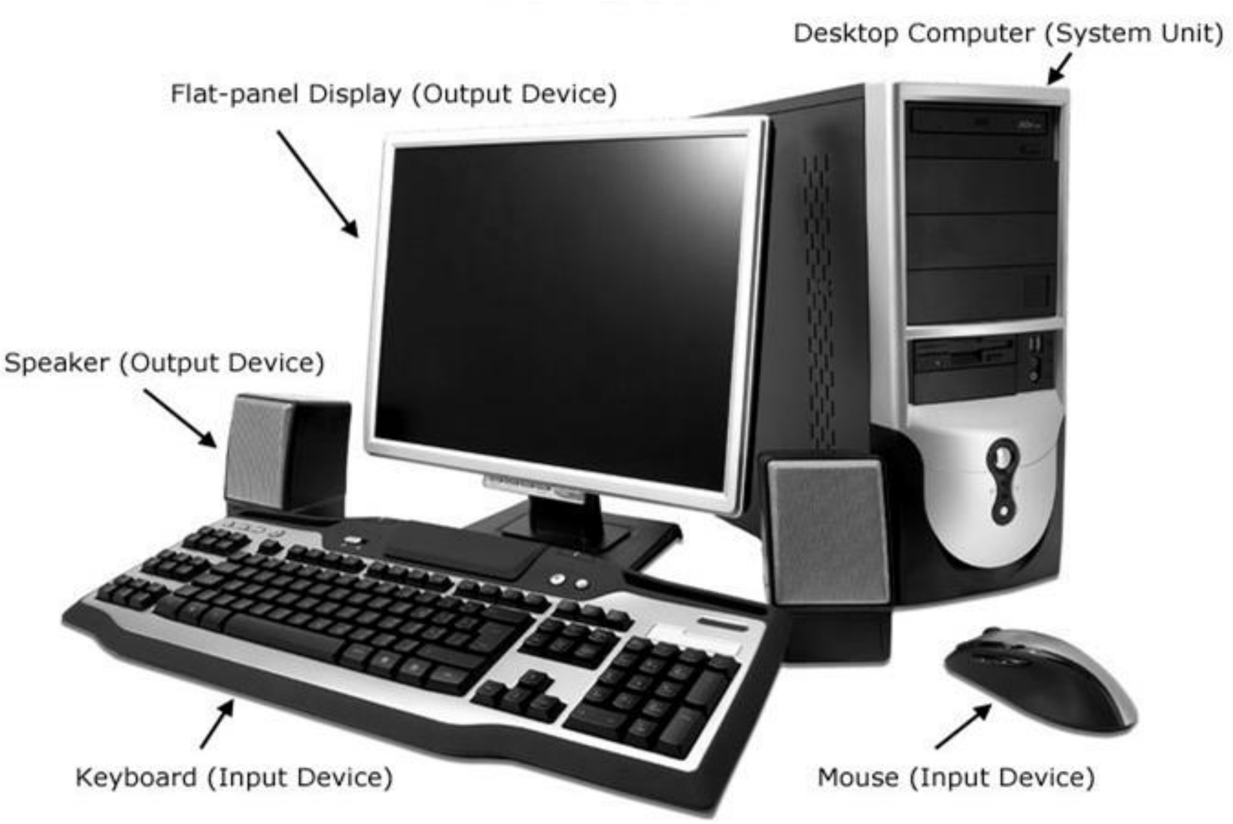
- Smartphone
- Microcomputer
- Workstation
- Personal computer
- Laptop
- Minicomputer
- Mainframe computer
- Supercomputer
- Tablet computer

Types of computers→

When talking about a computer or a "PC," you are usually referring to a desktop computer that you would find in a home or office. Today, however, the lines of what makes a computer are blurring. Below are all the different examples of what is considered a computer today.

- Console (e.g., Xbox and PS3)
- Desktop computer
- Diskless workstation and Thin client
- Embedded computers - The most common and used computer. An embedded computer is a computer with a specific function found in such things as ATMs, cars, microwaves, TVs, the VCR, and other home electronics.
- Hybrid computer
- Laptop, portable, notebook computer
- Mainframe or Supercomputer
- Microcomputer
- Nanocomputer
- Netbook
- PDA
- Personal computer (aka desktop and home computer)
- Server
- Set-top box
- Smartphone
- Tablet

Parts of desktop Computer / home Computer



Hardware:-

The term hardware covers all of those parts of a computer that are tangible physical objects. Circuits, computer chips, graphic cards, sound cards, memory (RAM), motherboard, displays, power supplies, cables, keyboards, printers and "mice" input devices are all hardware.

Software:-

Software refers to parts of the computer which do not have a material form, such as programs, data, protocols, etc. Software is that part of a computer system that consists of encoded information or computer instructions, in contrast to the physical hardware from which the system is built. Computer software includes computer programs, libraries and related non-executable data, such as online documentation or digital media. It is often divided into system software and application software. Computer hardware and software require each other and neither can be realistically used on its own. When software is stored in hardware then it cannot easily be modified, such as with BIOS ROM in an IBM PC compatible computer, which is sometimes called "firmware".

Operating systems:-

Operating systems are essential for computers to be able to do everything they need to do. Operating systems provide a software platform on top of which other programs, called *application programs*, can run. The application programs must be written to run on top of a particular operating system. Your choice of operating system, therefore, determines to a great extent the applications you can run. For PCs, the most popular operating systems are DOS, OS/2, and Windows, but others are available, such as Linux.

Classification of Operating systems→

Multi-user: Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.
Multiprocessing : Supports running a program on more than one CPU.
Multitasking : Allows more than one program to run concurrently.
Multithreading : Allows different parts of a single program to run concurrently.
Real time: Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

User Interaction With the OS→

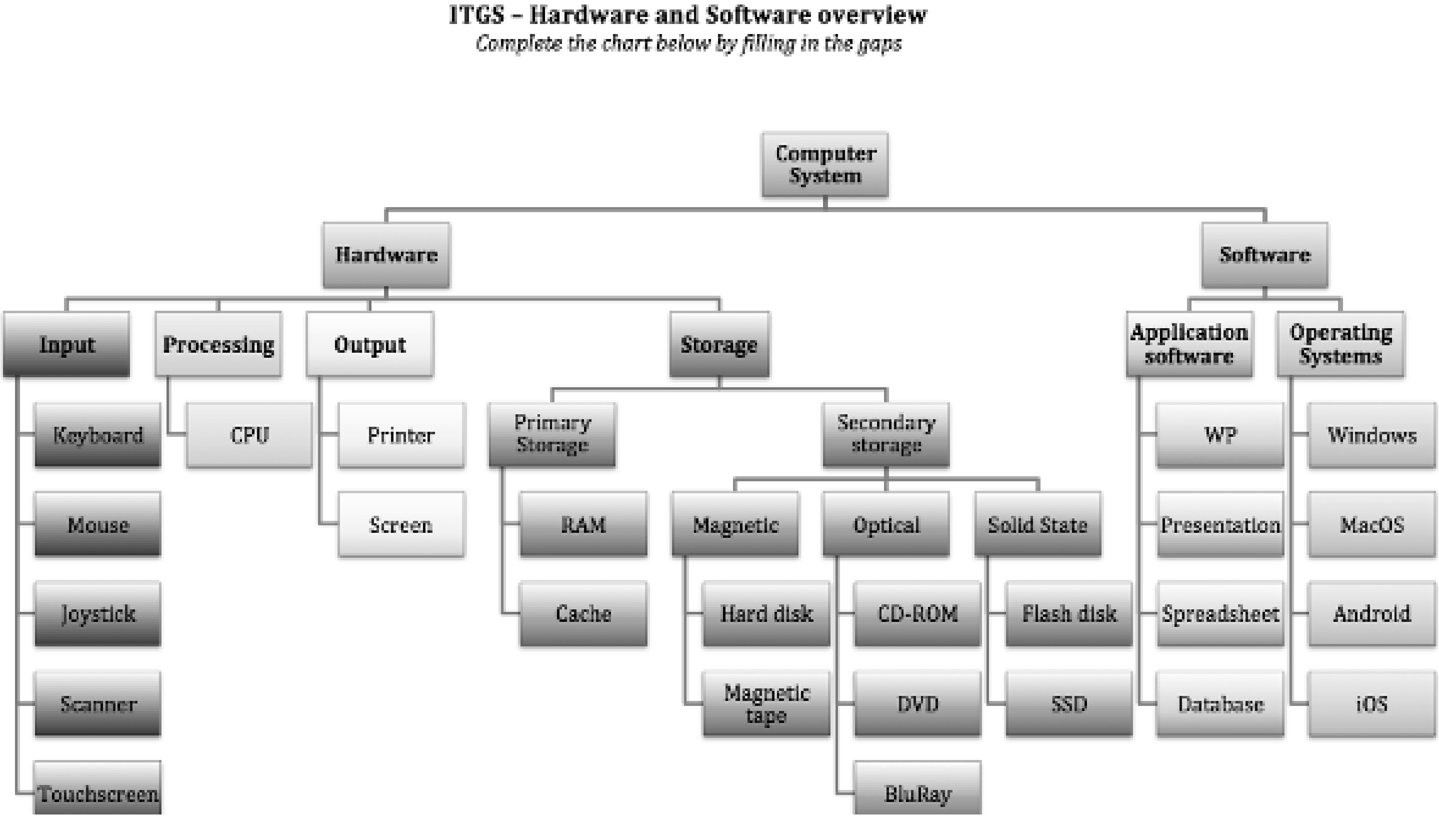
As a user, you normally interact with the operating system through a set of commands. For example, the DOS operating system contains commands such as COPY and RENAME for copying files and changing the names of files, respectively. The commands are accepted and executed by a part of the operating system called the command processor or command line interpreter. Graphical user interfaces allow you to enter commands by pointing and clicking at objects that appear on the screen.

Mobile Operating Systems→

In the same way that a desktop OS controls your desktop or laptop computer, a mobile operating system is the software platform on top of which other programs can run on mobile devices, however, these systems are designed specifically to run on mobile devices such as mobile phones, smartphones, PDAs, tablet computers and other handhelds. The mobile OS is responsible for determining the functions and features available on your device, such as thumb wheel, keyboards, WAP, synchronization with applications, email, text messaging and more. The mobile OS will also determine which third-party applications (mobile apps) can be used on your device.

Examples of Operating Systems→

Laptops, tablets, and desktop computers all run operating systems that you've probably heard of. Some examples include versions of Microsoft Windows (like Windows 10, Windows 8, Windows 7, Windows Vista, and Windows XP), Apple's macOS (formerly OS X), Chrome OS, BlackBerry Tablet OS, and flavors of the open source operating system Linux. Your smartphone runs an operating system, too, probably either Apple's iOS or Google's Android. Both are household names but you may not have realized that they are the operating systems being utilized on that devices.Servers, like those that host the websites you visit or serve the videos you watch, typically run specialized operating systems, designed and optimized to run the special software required to make them do what they do. Some examples include Windows Server, Linux, and FreeBSD.



ITGS – Hardware and Software overview

Complete the chart below by filling in the gaps

Network:-

A network consists of two or more computers that are linked in order to share resources (such as printers and CDs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

Two very common types of networks include:

- Local Area Network (LAN)
- Wide Area Network (WAN)

We put together this handy reference guide to explain the types of networks in use today, and what they're used for.

1. Personal Area Network (PAN)
2. Local Area Network (LAN)
3. Wireless Local Area Network (WLAN)
4. Campus Area Network (CAN)
5. Metropolitan Area Network (MAN)
6. Wide Area Network (WAN)
7. Storage-Area Network (SAN)
8. System-Area Network (also known as SAN)
9. Passive Optical Local Area Network (POLAN)
10. Enterprise Private Network (EPN)
11. Virtual Private Network (VPN)

Internet:-

The Internet is the biggest world-wide communication network of computers. Internet has millions of smaller domestic, academic, business, and government networks, which together carry many different kinds of information. The term is sometimes abbreviated as "the net".

The World Wide Web is one of its biggest services. It is used by a few billion people all over the world.

The Internet was developed in the United States by the "United States Advanced Research Projects Agency" (DARPA). Internet was first connected in October, 1969, and was called ARPANET. The World Wide Web was created at CERN in Switzerland in 1990 by a British (UK) scientist named Tim Berners-Lee.

Today, people can pay money to access the Internet from Internet Service providers. Some services on the Internet cost nothing to use. Sometimes people who offer these free services use advertising to make money. Censorship and freedom of speech on the Internet can be controversial.

Input Devices: - When unprocessed data is sent to the computer with the help of input devices, the data is processed and sent to output devices. The input devices may be hand-operated or automated. The act of processing is mainly regulated by the CPU.	**Output Devices**:-The means through which computer gives output are known as output devices.
• Computer keyboard	• Computer monitor
• Digital camera	• Printer
• Digital video	• PC speaker
• Graphics tablet	• Projector
• Image scanner	• Sound card
• Joystick	• Video card
• Microphone	
• Mouse	
• Overlay keyboard	
• Real-time clock	
• Trackball	
• Touch screen	

Computers Uses:-

Computers are used in so many fields in our daily life. From Engineers to Doctors, Students, Teachers, the Government Organizations, they all use computers to perform specific tasks, for entertainment or just to finish office work. Computers have made our life easier. With greater precision and accuracy and less time taking computers can do a lot in short time, while that task can take a lot of time while doing manually. Computers have taken industries and businesses to a whole new level.

They are used at Home , Offices, Hospitals, Government/Private organizations for work & entertainment purposes. Here we are going to discuss some of the uses of computers in various fields.

- **Uses of Computer at Home→**

1. Home Economical Budget
2. Computer Games
3. Working from Home
4. Entertainment
5. Information
6. Chatting & Social Media

- **Uses of Computers in Education→**

1. Computer-Based Training (CBT)
2. Computer Aided Learning (CAL)
3. Distance Learning
4. Online Examination

- **Uses of Computers in Business→**

1. Marketing
2. Stock Exchange

- **Uses of computers in Medical Field→**

1. Hospital Management System
2. Patient History
3. Patients Monitoring
4. Life Support Systems
5. Diagnosis Purpose

Computer is also used by Defence Organisations in various ways.

Computers Future:-

There is active research to make computers, out of many promising new types of technology, such as, optical computers, DNA computers, neural computers, and quantum computers. Most computers are universal, and are able to calculate any computable function, and are limited only by their memory capacity and operating speed. However different designs of computers can give very different performance for particular problems; for example quantum computers can potentially break some modern encryption algorithms (by quantum factoring) very quickly.

Computer architecture paradigms→

There are many types of computer architectures:

- Quantum computer vs. Chemical computer
- Scalar processor vs. Vector processor
- Non-Uniform Memory Access (NUMA) computers
- Register machine vs. Stack machine
- Harvard architecture vs. von Neumann architecture
- Cellular architecture

Of all these abstract machines, a quantum computer holds the most promise for revolutionizing computing. Logic gates are a common abstraction which can apply to most of the above digital or analog paradigms.

The ability to store and execute lists of instructions called programs makes computers extremely versatile, distinguishing them from calculators. The Church–Turing thesis is a mathematical statement of this versatility: any computer with a minimum capability (being Turing-complete) is, in principle, capable of performing the same tasks that any other computer can perform.

Therefore, any type of computer (netbook, supercomputer, cellular automaton, etc.) is able to perform the same computational tasks, given enough time and storage capacity.

Artificial intelligence→

A computer will solve problems in exactly the way it is programmed to, without regard to efficiency, alternative solutions, possible shortcuts, or possible errors in the code. Computer programs that learn and adapt are part of the emerging field of artificial intelligence and machine learning. Artificial intelligence based products generally fall into two major categories: rule based systems and pattern recognition systems. Rule based systems attempt to represent the rules used by human experts and tend to be expensive to develop. Pattern based systems use data about a problem to generate conclusions. Examples of pattern based systems include voice recognition, font recognition, translation and the emerging field of on-line marketing.

Professions and organizations→

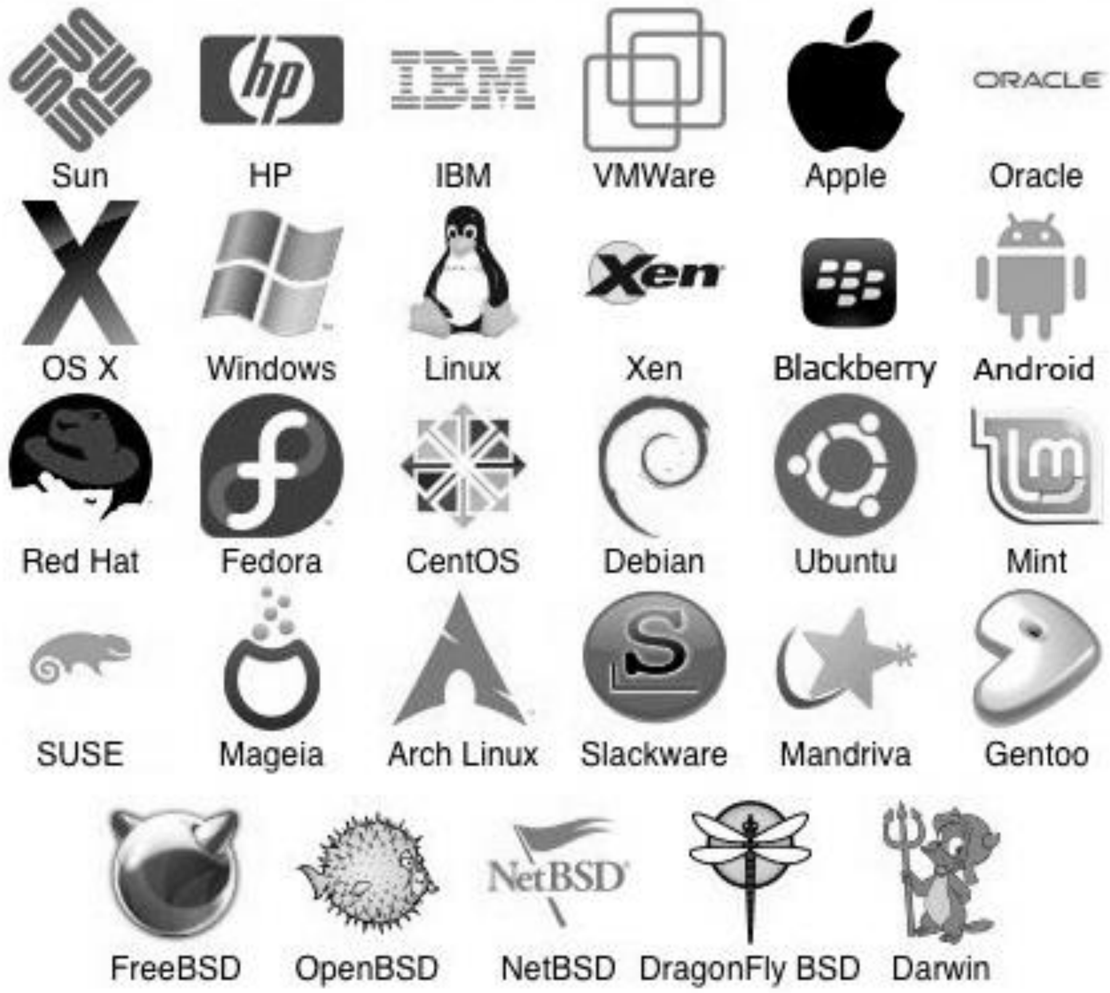
As the use of computers has spread throughout society, there are an increasing number of careers involving computers.

Computer-related professions	
Hardware-related	Electrical engineering, Electronic engineering, Computer engineering, Telecommunications engineering, Optical engineering, Nanoengineering
Software-related	Computer science, Computer engineering, Desktop publishing, Human–computer interaction, Information technology, Information systems, Computational science, Software engineering, Video game industry, Web design

The need for computers to work well together and to be able to exchange information has spawned the need for many standard organizations, clubs and societies, of both formal and informal nature.

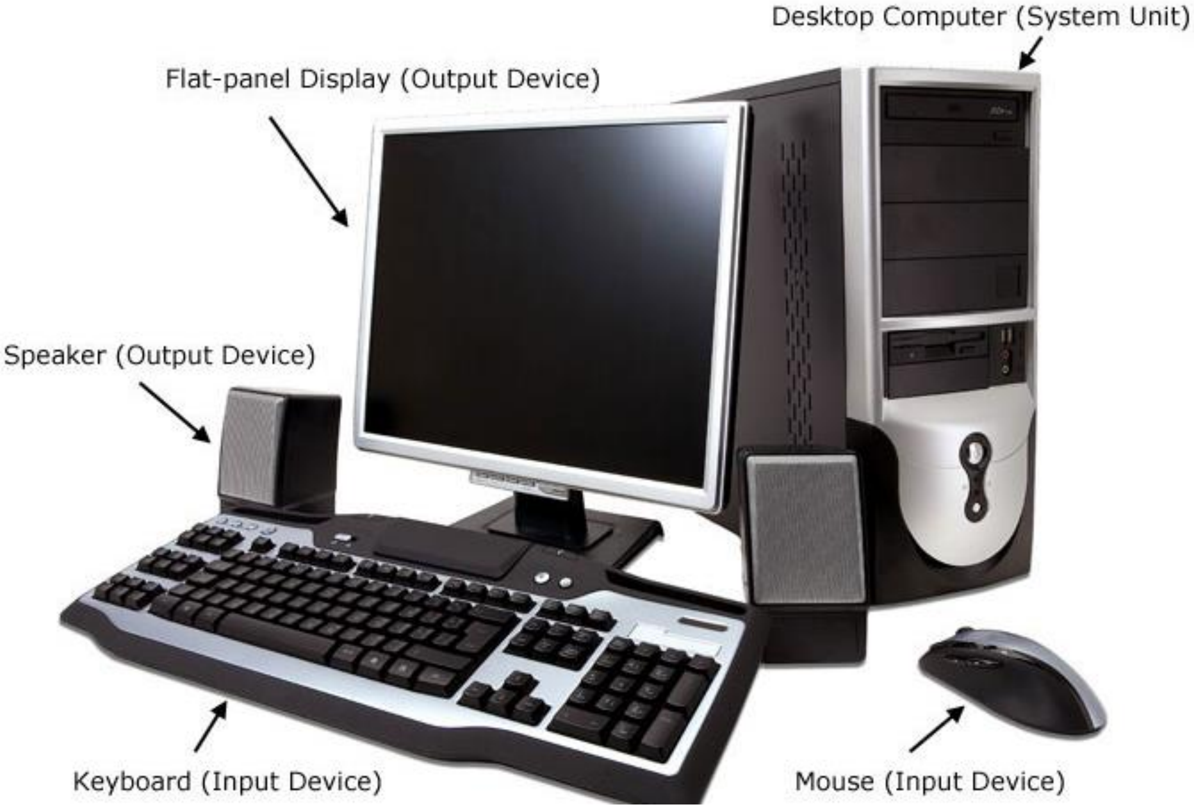
Thank You...

Operating system –
The brain behind your electronic devices



Some popular operating system

Note



Name: MR. RAMESWAR MISHRA

Contact No. 09439425882/07077235390